

Abstract Title: An overview of the Compensated Earth-Moon-Earth
Retroreflector Laser Link (CEMERLL) experiment.

Keith E. Wilson
Jet Propulsion Laboratory
Caltech

Jet Propulsion Laboratory
4800" Oak Grove Drive
Pasadena, CA 91109
TEL: (818)354-9387 FAX: (818)393-6142,
E-mail: kwilson@qmail.jpl.nasa.gov

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Abstract Text

The requisite SNR for optical beacons or uplink command signals sent to deep space probes can be achieved by either developing high repetition rate high peak power lasers and associated high-damage-threshold optical components or by propagating near-diffraction-limited beams to the spacecraft. This paper gives an overview of the first transmission of a narrow adaptive-optics compensated laser beam to the retroreflectors left on the Moon by the Apollo 11, 14 and 15 astronauts. The experiment will assess the applicability of adaptive optics techniques to optical communications with an emphasis on calibrating the performance advantages that this technology would afford future uplink laser communication. The transmitter is a 20 Hz repetition rate Nd:YAG laser coupled to the 1.5-m telescope at Starfire Optical Range (SOR), and laser guide star techniques will be used to propagate near-diffraction-limited 1 microradian laser beam to the Moon. The receiver is the 3.5-m telescope that recently installed at SOR. The results from the experiment will be compared against those obtained using an atmosphere-seeing-limited 10 microradian beam.

Biography

Keith Wilson received his Ph.D. from the University of Southern California in January 1980. Since that time he has held positions of Assistant Physics Professor at California State Polytechnic University at Pomona, Sr. Development Engineer at Allied Corporation, and Member of the Technical Staff in the Fiber optics Division of Litton Guidance and Control Systems. He joined JPL in August 1988. Dr. Wilson has published over a dozen papers in Laser Physics, Integrated Optics and related areas and holds three patents in fiber optic gyroscope technology. Most recently he was responsible for managing the first deep space optical communications link, GOPEX. Currently, he is responsible for managing JPL's Research and Technology Objectives and Plans work in Optical Communication Technology Development.